# RayBio®Phospho Mek1 (Ser217/221) and Pan Mek1 ELISA Kit

## For Measuring Phospho-Mek1 (Ser217/221) and Pan Mek1 in Human, Mouse and Rat Cell Lysates

## User Manual
## (Revised May 18, 2012)

## RayBio® Phospho-Mek1 (Ser217/221) and Pan Mek1 ELISA Kit Protocol

(Cat#: PEL-Mek-S217-T)

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RayBiotech, Inc.

# RayBio® Phospho-Mek1 (Ser217/221) and Pan Mek1 ELISA Kit Protocol

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# I. INTRODUCTION

RayBio® Phospho-Mek1 (Ser217/221) and Pan Mek1 ELISA (Enzyme-Linked Immunosorbent Assay) kit is a very rapid, convenient and sensitive assay kit that can monitor the activation or function of important biological pathways in cell lysates. By determining phosphorylated Mek1 protein in your experimental model system, you can verify pathway activation in your cell lysates. You can simultaneously measure numerous different cell lysates without spending excess time and effort in performing a Western Blot analysis.

This Sandwich ELISA kit is an in vitro enzyme-linked immunosorbent assay for the measurement of phospho-Mek1 (Ser217/221) and pan Mek1 in human, mouse and rat cell lysates (help normalize the results of phospho-Mek1 from different cell lysate being compared). An pan Mek1 antibody has been coated onto a 96-well plate. Samples are pipetted into the wells and Mek1 present in a sample is bound to the wells by the immobilized antibody. The wells are washed and anti-phospho-Mek1 (Ser217/221) or anti-pan-Mek1 is used to detect phosphorylated or pan Stat3. After washing away unbound antibody, HRP-conjugated anti-rabbit IgG is pipetted to the wells. The wells are again washed, a TMB substrate solution is added to the wells and color develops in proportion to the amount of Mek1 (Ser217/221) or pan Mek1 bound. The Stop Solution changes the color from blue to yellow, and the intensity of the color is measured at 450 nm.

## II. MATERIAL PROVIDED

1. Mek1 Microplate (Item A): 96 wells (12 strips x 8 wells) coated with anti-pan-Mek1 antibody.
2. Wash Buffer Concentrate (20x) (Item B): 25 ml of 20x concentrated solution.
3. Assay Diluent (Item E2): 15 ml of 5x concentrated buffer. For diluting cell lysate sample, detection antibody (Item C-1 and Item C-2) and secondary antibody (Item D-1) Concentrate.
4. Detection Antibody Mek1 (Ser217/221) (Item C-1): 1 vial of rabbit anti-phospho-Mek1 (Ser217/221) (1 vial is enough to assay half microplate).
5. Detection Antibody Mek1 (Item C-2): 1 vials of rabbit anti-pan-Mek1 (1 vial is enough to assay half microplate).
6. HRP-conjugated Anti-rabbit IgG (Item D-1): 25 μl of 500x HRP-conjugated Anti-rabbit IgG concentrate.
7. TMB One-Step Substrate Reagent (Item H): 12 ml of 3,3’,5,5’-tetramethylbenzidine (TMB) in buffered solution.
8. Stop Solution (Item I): 8 ml of 0.2 M sulfuric acid.
9. Cell Lysate Buffer (Item J): 5 ml 2x cell lysis buffer (not including protease and phosphatase inhibitors).
10. Positive Control HelaT003-1 (Item K): 1 vial of lyophilized powder from treated Hela cell lysate.

## III. STORAGE

Upon receipt, the kit should be stored at –20 °C. Please use within 6 months from the date of shipment. After initial use, Wash Buffer Concentrate (Item B), Assay Diluent (Item E2), TMB One-Step

Substrate Reagent (Item H), Stop Solution (Item I) and Cell Lysate Buffer (Item J) should be stored at 4 °C to avoid repeated freeze-thaw cycles. Return unused wells to the pouch containing desiccant pack, reseal along entire edge and store at –20 °C. Item D-1 store at 2-8 $^{o}$C for up to one month (store at -20 $^{o}$C for up to 6 months, avoid repeated freeze-thaw cycles). Reconstituted Positive Control (Item K) should be stored at -70 °C.

## IV. ADDITIONAL MATERIALS REQUIRED

1 Microplate reader capable of measuring absorbance at 450 nm.
2 Protease and Phosphatase inhibitors.
3 Shaker.
4 Precision pipettes to deliver 2 µl to 1 ml volumes.
5 Adjustable 1-25 ml pipettes for reagent preparation.
6 100 ml and 1 liter graduated cylinders.
7 Distilled or deionized water.
8 Tubes to prepare sample dilutions.

## V. SAMPLE PREPARATION

Cell lysates - Rinse cells with PBS, making sure to remove any remaining PBS before adding the Cell Lysate Buffer. Solubilize cells at 4 x $10^{7}$ cells/ml in 1x Cell Lysate Buffer (we recommend adding protease and phosphatase inhibitors to Cell Lysate Buffer prior to sample preparation). Pipette up and down to resuspend and incubate the lysates with shaking at 2 - 8° C for 30 minutes. Microcentrifuge at 13,000 rpm for 10 minutes at 2 - 8° C, and

transfer the supernates into a clean test tube. Lysates should be used immediately or aliquoted and stored at –70 °C. Avoid repeated freeze-thaw cycles. Thawed lysates should be kept on ice prior to use.

For the initial experiment, we recommend to do a serial dilution testing such as 5-fold and 50-fold dilution for your cell lysates with Assay Diluent (Item E2) before use.

*Note: The fold dilution of sample used depends on the abundance of phosphorylated proteins and should be determined empiricallys. More of the sample can be used if signals are too weak. If signals are too strong, the sample can be diluted further.*

Cell Lysate Buffer should be diluted 2-fold with deionized or distilled water before use (recommend to add protease and phosphatase inhibitors).

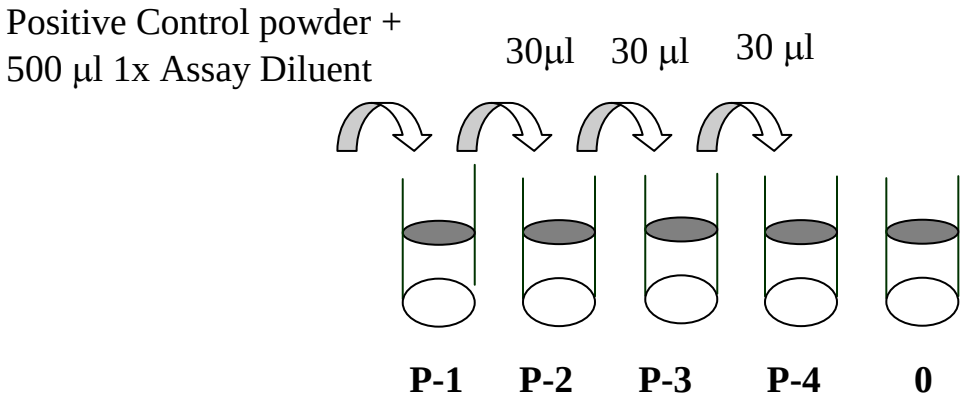
## VI. REAGENT PREPARATION

1. Bring all reagents and samples to room temperature (18 - 25°C) before use.

2. Item E2, Assay Diluent should be diluted 5-fold with deionized or distilled water before use.

3. Preparation of Positive Control: Briefly spin the Positive Control vial of Item K. Add 500 µl 1x Assay Diluent (Item E2, Assay

Diluent should be diluted 5-fold with deionized or distilled water before use) into Item K vial to prepare a Positive Control (P-1) Solution (See i. Positive Control of part IX. TYPICAL DATA for a typical result in page 9). **Dissolve the powder thoroughly by a gentle mix** (it can be removed by centrifuge if any precipitate in the solution is found). Pipette 270 µl 1x Assay Diluent into each tube. Use the Positive Control (1) to produce a dilution series (shown below). Mix each tube thoroughly before the next transfer. 1x Assay Diluent serves as the background.




4. If the Wash Concentrate (20x) (Item B) contains visible crystals, warm to room temperature and mix gently until dissolved. Dilute 20 ml of Wash Buffer Concentrate into deionized or distilled water to yield 400 ml of 1x Wash Buffer.

5. Briefly spin the detection antibody (Item C-1 or Item C-2) before use. Add 100 µl of 1x Assay Diluent into the vial to prepare a detection antibody concentrate. Pipette up and down to mix gently (the concentrate can be stored at 4°C for 5 days or at – 70°C for one month). The anti-phospho-Mek1 (Ser217/221) or anti-pan-Mek1 antibody should be diluted 55-fold with 1x Assay Diuent and used in step 4 of Part VII Assay Procedure.

6. Briefly spin the HRP-conjugated anti-rabbit IgG (Item D-1) before use. Pipette up and down to mix gently. HRP-conjugated anti-rabbit IgG concentrate should be diluted 500-fold with 1x Assay Diuent.

   *For example: Briefly spin the vial (Item D-1) and pipette up and down to mix gently. Add 10 μl of HRP-conjugated anti-rabbit IgG concentrate into a tube with 5 ml 1x AssayDiluent to prepare a 500-fold diluted HRP-conjugated anti-rabbit IgG solution.*

7. Cell Lysate Buffer should be diluted 2-fold with deionized or distilled water before use (recommend to add protease and phosphatase inhibitors).

## VII. ASSAY PROCEDURE:

1. Bring all reagents to room temperature (18 - 25°C) before use. It is recommended that all samples or Positive Control should be run at least in duplicate.

2. Add 100 μl of each sample or positive control into appropriate wells. Cover well with plate holder and incubate for 2.5 hours at room temperature or over night at 4°C with shaking.

3. Discard the solution and wash 4 times with 1x Wash Solution. Wash by filling each well with Wash Buffer (300 μl) using a multi-channel pipette or autowasher. Complete removal of liquid at each step is essential to good performance. After the

last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.

4. Add 100 µl of prepared 1x rabbit anti-phospho-Mek1 (Ser217/221) antibody or 1x rabbit anti-pan-Mek1 (Reagent Preparation step 5) to appropriate wells. Incubate for 1 hour at room temperature with shaking.

5. Discard the solution. Repeat the wash as in step 3.

6. Add 100 µl of prepared 1X HRP-conjugated anti-rabbit IgG to corresponding well. Incubate for over night at 4°C with shaking.

7. Discard the solution. Repeat the wash as in step 3.

8. Add 100 µl of TMB One-Step Substrate Reagent (Item H) to each well. Incubate for 30 minutes at room temperature in the dark with shaking.

9. Add 50 µl of Stop Solution (Item I) to each well. Read at 450 nm immediately.

## VIII. ASSAY PROCEDURE SUMMARY

1. Prepare all reagents, samples and standards as instructed.

2. Add 100 µl sample or positive control to each well.
   Incubate 2.5 hours at room temperature or over night at 4°C.

⇩

3. Add 100 µl prepared primary antibody to appropriate well.
   Incubate 1.0 hours at room temperature.

⇩

4. Add 100 µl prepared 1x HRP-conjugated anti-rabbit IgG to
   corresponding well. Incubate over night at 4°C.

⇩

5. Add 100 µl TMB One-Step Substrate Reagent to each well.
   Incubate 30 minutes at room temperature.

⇩

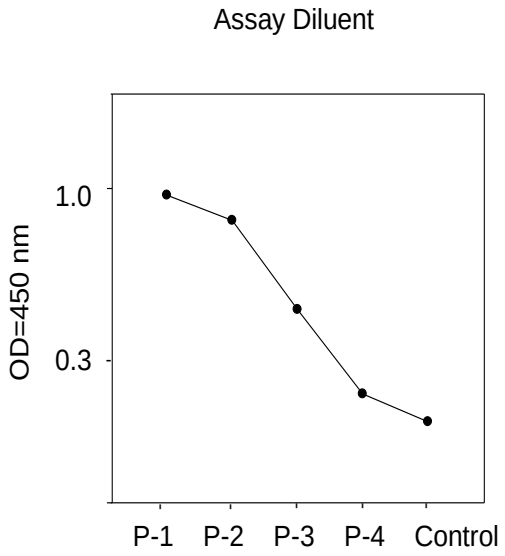
6. Add 50 µl Stop Solution to each well. Read at 450 nm
   immediately.

## IX. TYPICAL DATA

ELISA data analysis: Average the duplicate readings for each sample or positive.

### i. Positive Control

Hela cells were treated with TPA at 37°C for 15 min. Solubilize cells at 4 x $10^7$ cells/ml in Cell Lysate Buffer. Serial dilutions of cell lysates were analyzed in this ELISA. Please see step 3 of Part VI Reagent Preparation for detail.

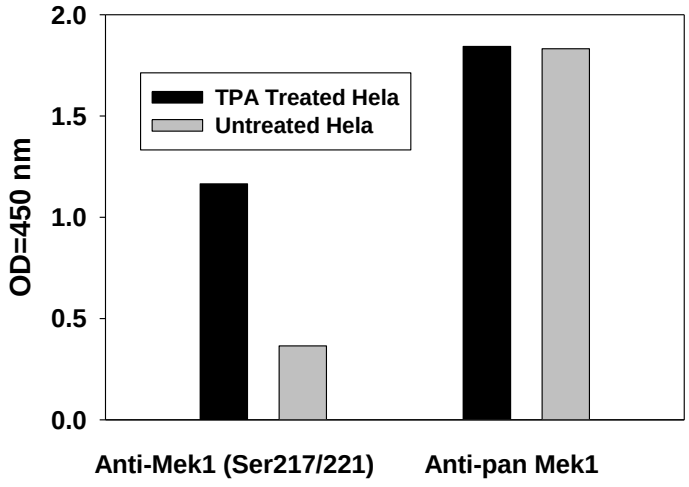



Positive control dilution series

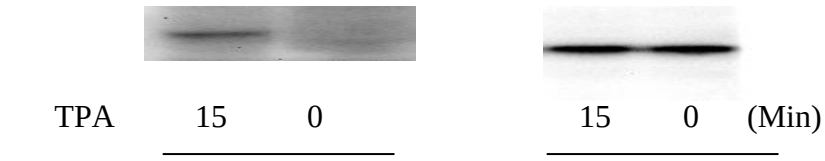
## ii. TPA Stimulation of Hela Cell Lines

Hela cells were treated or untreated with TPA for 15 min. Cell lysates were analyzed using this phosphoELISA and Western Blot.

### A). ELISA



## B). Western-Blot Analysis




Anti-phospho-Mek1 (Ser217/221) Anti-pan Mek1

# X. REFERENCES:

1. Cowley, S. et al. (1994) *Cell*, 77, 841-852.

2. Crews, C.M. et al. (1992) *Science*, 258, 478-480.

3. Alessi, D.R. et al. (1994) *EMBO J.* 13, 1610-1619.

# XI. TROUBLESHOOTING GUIDE

| Problem | Cause | Solution |
|---|---|---|
| 1. Sample signals: | | |
| a. Too low | a. Sample concentration is too low | a. Increasing sample concentration |
| b. Too high | b. Sample concentration is too high | b. Reducing sample concentration |
| 2. Large CV | a. Inaccurate pipetting | a. Check pipettes |
| 3. High background | a. Plate is insufficiently washed | a. Review the manual for proper washing. If using an automated plate washer, check that all ports are unobstructed. |
| | b. Contaminated wash buffer | b. Make fresh wash buffer |
| 4. Positive Control: Low signal | a. Improper storage of the ELISA kit | a. Upon receipt, the kit should be stored at –20 $^{o}$C. Store the positive control at -70$^{o}$C after reconstitution. |
| | b. Stop solution | b. Stop solution should be added to each well before measurement and read OD immediately. |
| | c. Improper primary or secondary antibody dilution | c. Ensure correct dilution |

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**Protein Array**

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**Peptide**

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## Note:

## Note:

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